

IN THE CLAIMS

This is a complete and current listing of the claims, marked with status identifiers in parentheses. The following listing of claims will replace all prior versions and listings of claims in the application.

1. (Currently Amended) An apparatus for fetal monitoring comprising:
 - a) means for determining a fetal heart rate development over time,
 - b) means for identifying a primary fetal heart rate component ~~which is required to shift a volume of blood from the heart to the cardiovascular system,~~
 - c) means for subtracting the primary component from the determined fetal heart rate to determine a residual component; and
 - d) means for using said residual component for analysis of the fetal heart rate beat-to-beat variation,

wherein the primary fetal heart rate component is identified through a polynomial curve fit approximation of the fetal heart rate data, and by:

- (i) dividing the fetal heart rate data into periods of time of a predetermined size; and
- (ii) performing individual polynomial approximations of the fetal heart rate data for each period of time.

2. (Previously Presented) An apparatus as claimed in claim 1, wherein said means for identifying the primary fetal heart rate component is adapted to perform the following steps:

- (i) linear interpolation of recorded fetal heart rate data;
- (ii) resampling at a resampling frequency, thereby forming a resampled series of fetal heart rate data, and;
- (iii) polynomial curve fit approximation of said resampled series.

3. (Currently Amended) An apparatus as claimed in claim 1-~~or 2~~, wherein the polynomial curve fit approximation utilises polynomials of at least the 5th order.
4. (Previously Presented) An apparatus as claimed in claim 3, wherein said polynomials are of the 5th order.
5. (Previously Presented) An apparatus as claimed in claim 3, wherein said polynomials are of the 12th order.
6. (Currently Amended) An apparatus as claimed in ~~any one of the preceding claims~~claim 1, wherein the polynomial approximation is obtained through a least squares approximation.
7. (Currently Amended) An apparatus as claimed in ~~any one of the preceding claims~~claim 1, wherein each polynomial approximation is constrained such that neighbouring polynomial functions align and have equal first derivatives at the period border where they join.
8. (Currently Amended) An apparatus as claimed in ~~any one of the preceding claims~~claim 1, wherein the predetermined size is greater than or equal to a time corresponding to 20 consecutive heart rate samples.
9. An apparatus as claimed in claim 8~~7~~, wherein the predetermined size is a time corresponding to 20 consecutive heart rate samples.

10. (Currently Amended) An apparatus as claimed in ~~any preceding claim~~claim 1, wherein the means for using said residual component for analysis of the fetal heart rate beat-to-beat variation is adapted to apply statistical tests for analysing the residual component in order to determine the response of the fetus.

11. (Currently Amended) An apparatus as claimed in claim 10, wherein the statistical test comprises monitoring of a 95th percentile of the fetal heart rate residual component.

12. (Previously Presented) An apparatus as claimed in claim 11, wherein the statistical test further comprises calculating a median and a variance of said 95th percentile over a predetermined period of time.

13. (Previously Presented) An apparatus as claimed in claim 12, wherein said predetermined period of time is longer than 10 minutes.

14. (Currently Amended) An apparatus as claimed in ~~any one of claims 11 to 13~~claim 12, wherein if the median of the 95th percentile is consistently below 3ms the fetal heart rate is classed as abnormal and non-reactive.

15. (Currently Amended) An apparatus as claimed in ~~any one of claims 10 to 13~~claim 12, wherein said means for using said residual component for analysis of the fetal heart rate beat-to-beat variation is adapted to indicate a significant reduction of fetal reactivity given a recording of the median of the 95th percentile below 2.3 ms and the variance of the 95th percentile below 0.1 over an extended period of time.

16. (Currently Amended) An apparatus as claimed in ~~any one of claims 10 to 13~~claim 12, wherein said means for using said residual component for analysis of the fetal heart rate beat-to-beat variation is adapted to indicate a significant reduction of fetal reactivity given a recording of a decreasing trend of the median of the 95th percentile over an extended period of time.

17. (Currently Amended) An apparatus as claimed in ~~any one of claims 10 to 13~~claim 12, wherein said means for using said residual component for analysis of the fetal heart rate beat-to-beat variation is adapted to exclude an abnormally low fetal heart rate variation if the median of the 95th percentile is consistently above 3ms.

18. (Previously Presented) An apparatus as claimed in claim 10, wherein the statistical test comprises monitoring of a short term, e.g. 3-4ms, frequency distribution of the fetal heart rate residual component.

19. (Previously Presented) An apparatus as claimed in claim 18, wherein if a 3-4ms frequency distribution is less than 7% the fetal heart rate is classed as non-reactive.

20. (Currently Amended) A method for fetal monitoring comprising the steps of:
a) determining a fetal heart development rate over time,
b) identifying a primary fetal heart rate component ~~which is required to shift a volume of blood from the heart to the cardiovascular system~~,

- c) subtracting the primary component from the determined fetal heart rate to determine a residual component; and
- d) using said residual component for analysis of the fetal heart rate beat-to-beat variation, wherein the primary fetal heart rate component is identified through a polynomial curve fit approximation of the fetal heart rate data, and by:
 - (i) dividing the fetal heart rate data into periods of time of a predetermined size; and
 - (ii) performing individual polynomial approximations of the fetal heart rate data for each period of time.

21. (Previously Presented) A computer program for executing the steps of claim 20 when the programme is executed in a programmable apparatus according to claim 1.